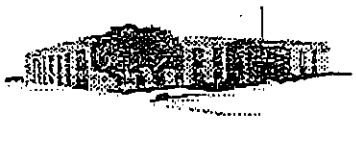



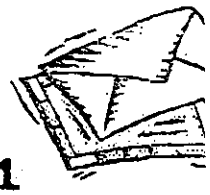

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U.S. Department of Energy
Richland Operations Office
Office of Site Services

Phone: (509) 373-9337
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To: TERI ELZIE

Fax: 372-9654

From: JAMIE

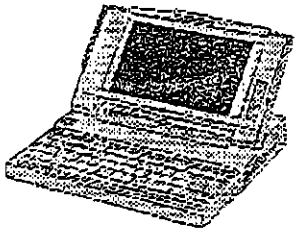
Pages: 6 + COVER

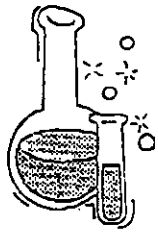
Notes:

TERI,

PLEASE ADD TO NRC FILE ON ERDF + GIVE KEN A COPY. THANKS.

JAMIE





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Action and Budget Proposal for Interagency Agreement # DE-A106-99RL14006 Modification A002

Restoration of naturally damaged shrub-steppe habitat on Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE)

Action Proposal

Introduction:

One of the primary goals of the U.S. Fish and Wildlife Service on the Hanford Reach National Monument/Saddle Mountain National Wildlife Refuge (HRNM/SMNWR) is to protect and restore the native habitats and biodiversity of the Columbia Basin shrub-steppe ecosystem. The maintenance of an intact population of Wyoming big sagebrush (*Artemisia tridentata* var. *wyomingensis*) is a critical aspect of achieving this management goal. The Hanford Site is considered one of the largest contiguous blocks of shrub-steppe habitat in the state of Washington. Maintaining a component of sagebrush, and other shrubs, across the landscape of the Monument increases the number and diversity of wildlife species inhabiting the area. A variety of wildlife require shrub cover for feeding, hiding, nesting, and thermoregulation. Maintaining shrub cover, therefore, is a necessary component of wildlife habitat, particularly for shrub-steppe obligate species such as the sage sparrow (*Amphispiza belli*) and loggerhead shrike(*Lanius ludovicianus*). The Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE), an administrative unit of the National Monument, has been recognized as a Research Natural Area (RNA) and a National Environmental Research Park (NERP) due to it's ecological value. Although this 77,000 unit is relatively pristine, it is not free from ecological disturbances. The primary perturbation that has set back succession in this area has been wild fires, ignited by both natural (lightning), and more often human induced causes

Recent, repeated large fires (in 1978, 1981, 1984, 1996, 1998, 2000) have eliminated nearly all of the shrub component of the ALE ecosystem. Most recently, the 24 Command Fire of 2000, burned approximately 163,884 acres between June 27 and July 1, 2000. This fire was ignited by a vehicle accident the afternoon of June 27. Driven by high winds and temperatures and low humidity, the fire quickly spread over the next two days and consumed 163,884 acres of Federal, state, and private lands. Of the total, ~ 69,244 acres of mature shrub-steppe plant community was burned. Approximately ~ 26,500 acres of this mature habitat was located on ALE. Unlike rabbit-brush (*Chrysothamnus* sp.), big sagebrush and antelope bitterbrush (*Purshia tridentata*) usually do not re-sprout following fire. Active restoration through seeding or planting is necessary to reestablish this component of the ecosystem. Following the 24 Command Fire a Burned Area Rehabilitation Plan (BAER) was written to begin stabilize and rehabil tate the burned area.

Restoration of sagebrush on the ALE portion of the HRNM/SMNWR has been conducted as part of the post-fire restoration strategy on ALE (~ 500 acres), and also as a mitigation strategy for developments within the central plateau portion of the Hanford Site. Initial sage seedling plantings were completed as mitigation for ERDF (Environmental Restoration and Disposal facility) in 1998. During this project, approximately 75,000 seedlings were planted covering

nearly 200 acres. Following this activity, a second project was conducted on ALE to mitigate for W-519 development on the Hanford Site. During this project, in 1999, approximately 51,000 sagebrush plants were planted covering 130 acres. See document entitled "Planting and Experimental design for the W-519 Compensatory Mitigation Sagebrush Planting"(M. Sackschewsky, Pacific Northwest National Lab, dated 09/20/1999). The post-fire restoration planting of 2000, installed a total of 173,348 sagebrush plants in fulfillment of the EAER plan specifications.

Restoration of a functioning ecosystem requires more than planting of a single species of shrub, however. Non-native plants, such as cheat grass (*Bromus tectorum*), can invade following a disturbance such as wild fire. Cheat grass, so named because it germinates early, "cheats" the other plants out of moisture, and can prevent native plants from recovering after a disturbance. Cheat grass is also a fine fuel that carries fire, and it dries out and has the potential to ignite much earlier each season than native grasses. Native perennial grasses are often weakened by fire because wild fires tend to burn during their active growth period and cause scorching of plant crowns. Thus, native grasses can become stressed or killed, and be replaced by cheat grass, which forms a monoculture, and may ignite to cause more fires. This process is known as the cheat grass/fire cycle. Cheat grass interrupts the normal, gradual process of succession that would eventually lead to a "climax" community of mature shrubs with robust bunch grass in the understory. Replacement of native plant communities with cheat grass monoculture that perpetuates itself is known as a "dis-climax". A community in dis-climax has greatly reduced biodiversity of both plant and animal species. Additionally, a dis-climax alters ecosystem structure, and can alter ecosystem functions such as nutrient cycling and water infiltration. Thus, ecosystem restoration/rehabilitation and mitigation is best achieved by restoring entire native plant communities, including multiple species of grasses, forbs and shrubs.

The goal of this restoration activity will be to attempt to restore several components of the ecosystem across the landscape of the ALE. The project will attempt to bridge landscape gaps and increase connectivity of habitat areas. Restoring the shrub-steppe ecosystem of the Columbia Basin is complicated by the arid climate and limited precipitation (~ 6" annually). Additionally, relatively little research has been conducted on methods by which these ecosystems can be restored. This project will use the best available information, collected from local and regional experts, to restore 510 acres on the ALE. Several species of grasses and shrubs will be either seeded or planted. Every attempt will be made to implement this project in a way that will help to refine current restoration techniques so that future restoration/mitigation efforts will be more successful and efficient.

Description of Action Treatments:

Common Features:

(1) Selection of Habitat Areas to be Restored:

Staff time is required by the Wildlife Biologist (Biologist), Biological technician (Technician), Archeologist, and Refuge Operations Specialist to plan, coordinate with DOE-RL and others, map, survey, design, the project in relation to other on-going and past projects, and existing

habitat patches. In addition, the same staff members will locate field sites, lay out, design, coordinate with RL and others, mark, take coordinates and map field sites. Additional staff time will be required to survey and clear field sites to avoid sensitive biological and cultural resources. Additional time by Biologist, Technician, Refuge Operations Specialist, Archeologist, Equipment Operator and Maintenance worker may include gathering supplies, ordering equipment and materials, preparing equipment, preparing seed bed, spraying, signing and seeding.

(2) Seed Collection
Field time for Biologist and Technician is required to gather native seed stock in the field. This will involve locating species of interest, and monitoring their phenology, development, flowering and seed set in order to time the collection of seed adequately. Collection requires gathering seed from numerous individual plants over a wide area in order to represent the genetic diversity found within the stock. Multiple species will be monitored simultaneously to maximize the efficient gathering of several species in the quantities required. Coordination with the USDA or state seed lab for seed storage and germination testing will also be required.

(3) Shrub seedling and grass plug production
Further planning time is required by the Biologist, Budget Analyst, and Office Automation Clerk, to prepare contracts, gather bids, coordinate contracts, submit purchase orders, process acquisitions, obtain plant materials and services from native plant and seed producers, and professional planting contractors. Additional time by the Biologist is required to coordinate with contractors for seed cleaning, production, delivery, and for quality control/assurance on plant material to ensure the plants meet requirements of Statement of Work.

(4) Planting
Staff time is required by the Biologist, Technician, Refuge Operations Specialist, and Maintenance worker to coordinate, assist, oversee and help implement all field work on the ground, whether field work is conducted by staff or contractors. The Biologist is required to monitor weather patterns and predictions, soil moisture, and site conditions to determine planting dates, and to do quality control/assurances on the planting contractors to determine if planting or seeding has been done correctly, at proper density or pounds per acre, etc.

(5) Reporting
Staff time by the Biologist and Technician is required to prepare field notes, interim reports, and final reports on implementation of the Interagency Agreement. Biologist and technician will also be required to coordinate with Bechtel regarding the monitoring effort following the implementation of the project.

Treatment A:
Experimental treatment of sand blown areas – 80 acres

Lower elevation, highly disturbed sites will be chosen, probably within the area that is

experiencing wind erosion. Soil type is sandy (most likely Hezel sand) and stabilization of this area to reduce the wind erosion is needed. Process would include preparing the planting area by using a herbicide treatment to reduce competition from non-native invasive plants, followed by use of a professional planting crew to hand plant, grass plugs and a mix of native shrubs. Plugs would all be produced through collection of seed on site and production of seedling plants from seed collected on site. Professional nurseries would be contracted to grow plants. Typically a 10 cu. inch container stock would be produced from seed provided. Advantages of this experimental treatment are that survival and establishment of a native plant community is highly likely, leading to the development of a multi-species native grass community. Once established the native grasses may begin to out-compete some encroachment by non-native plants and noxious weeds. Stabilization of soil is also highly likely under this treatment. Rabbitbrush, will be installed as shrub cover. The advantages of rabbitbrush species is their ability, once established, to re-sprout following a wild fire. This allows some insurance on the "investment" of planting shrubs as wildlife habitat. Disadvantage of this treatment is that it is expensive for both plant materials and planting contract costs due to the number of plants per acre installed.

Plant materials include:		# plants for 80 acre treatment
Grass plugs of:		
Agropyron dasystachyum	Thickspike Wheatgrass	-- 20,000
Oryzopsis hymenoides	Indian Ricegrass	-- 30,000
Stipa comata	Needle and Thread grass	-- 30,000
Shrub seedlings of:		
Chrysothamnus viscidiflorus	Green rabbitbrush	-- 4,000
Chrysothamnus nauseosus	Gray rabbitbrush	-- 4,000
Purshia tridentata	Antelope bitterbrush	-- 4,000
Artemisia tridentata var. *wyomingensis*	Big sagebrush	-- 12,000

Price per plug ~ $ 1.20 grasses, 0.80 shrubs (average), bare root sagebrush 0.35
Grass plugs would be planted at approximately 2 meter spacing, with a shrub planted every 4 meters.
Density of shrubs = ~ 300 per acre (4 meter spacing)
Density of grasses = ~ 1000 per acre (2 meter spacing)

Treatment B:
Restoration of native grass community through native seeding – 160 acres.

Sites chosen would be in previously disturbed areas with few native plants remaining in the understory. Process includes spraying herbicide on existing vegetation (cheat grass) to reduce competition during establishment of native grasses, and to prepare the seed bed for native grass seed establishment. Seeding would consist of broadcast application of native grass seed mix, followed by a light harrow. Seeding rate would be at approximately 10 lbs. PLS (pure live seed) per acre. Hanford derived seed would be used where possible, but other commercial varieties

would potentially also be used. A second herbicide application would be made after seed is planted, but before germination of seed, to control cheat grass. Advantages of this treatment are that the grass seed mix is less expensive than planting plugs. A larger area can be covered and a greater diversity of plants included in the mix. The disadvantage is that germination and establishment success is weather-dependant. Some establishment would most likely occur but vigor of the resulting stand could variable depending on weather conditions.

Proposed seed mix includes:	(Seed type and variety)
Oryzopsis hymenoides	Indian Ricegrass (Nez Par, Idaho)
Stipa comata	Needle and Thread grass (Hanford WA)
Sitanion hystrix	Bottlebrush Squirreltail (Oregon)
Poa sandbergii	Sandberg's Bluegrass (Hanford WA)
Agropyron dasystachyum	Thickspike Wheatgrass (Schwindemar, The Dalles, OR)
Depending on location:	
Elymus cinereus	Great Basin Wild rye (Magnar)
OR	
Agropyron spicatum	Bluebunch (Snakeriver) wheatgrass (Secar)

Price per pound of mix (including Hanford derived varieties {more expensive}) = ~ $ 22.00 (based on 2000 prices)

Treatment C:

Multiple species of shrubs installed into areas where understory plant community remains in-tact = 270 acres.

Sites for this treatment would be chosen for a high abundance and diversity of existing native plants in the understory, where only the shrub component of the ecosystem is missing. This treatment would involve installing shrubs at a density of approximately 350-450 plants per acre. Installation would be done by a professional reforestation contractor. A diversity of shrub seedlings would be installed. Nursery contracts could produce bare root sagebrush stock. Rabbitbrush and bitterbrush would be supplied as container stock. Advantages are that less ground will be disturbed, and the shrub component of the ecosystem will be restored. This treatment is less expensive than treatments A & B. Disadvantages are that seedling shrubs may experience a lower survival rate when planted into mature grass stands (mature grass may compete with smaller seedling shrubs), and that there are limited areas where the understory conditions remain unaffected by non-native plants.

Shrub seedlings of:		# of plants treatment 270/ac.
Chrysothamnus viscidiflorus	Green rabbitbrush	~14,400
Chrysothamnus nauseosus	Gray rabbitbrush	~14,400
Purshia tridentata	Antelope bitterbrush	~14,400
Artemisia tridentata var. *wyomingensis*	Big sagebrush	~ 64,800

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Budget Proposal for Interagency Agreement # DE-A106-99RL14006 Modification A002
Restoration of naturally damaged shrub-steppe habitat on Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE)

Total (received) from Department of Energy =	$ 450,000.00
Total Overhead (~ 14 %) at U. S. Fish and Wildlife Regional Office =	$ 54,727.79
Remaining at Hanford Reach National Monument/Saddle Mountain NWR	$ 395,272.21
Salary	
Wildlife Biologist (Biologist)	$40,500
Biologist Technician (Technician)	$20,600
Administrative support (local) - Budget analyst and Office Automation clerk	$ 5,000
Archeologist	$ 9,500
Refuge Operations Specialist	$ 7,000
Equipment operator	$ 6,500
Maintenance worker	$ 6,000
GIS mapping	$ 3,000
Total salary costs	$ 98,100
Operational costs	
Vehicles and fuel	$ 8,000
Equipment rental	$ 1,500
Supplies (compass, stakes, flagging, rebar, water containters, terra-sorb, measuring tape, rangefinder, etc.)	$ 3,000
Materials (herbicides, surfactant, etc.)	$ 2,000
Total Operational cost	$ 14,500
Plant materials and contracts	
Treatment A (80 acres)	
Native grass plugs	$ 96,000
Native shrub seedlings	$ 13,800
Planting contract	$ 35,360
Treatment B (160 acres)	
Native grass seed	$ 35,200
Herbicide treatment (2 applications labor)	$ 9,780
Treatment C (270 acres)	
Native shrub seedlings	$ 57,240
Planting contract	$ 36,720
Total Plant materials and contracts	$284,100

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